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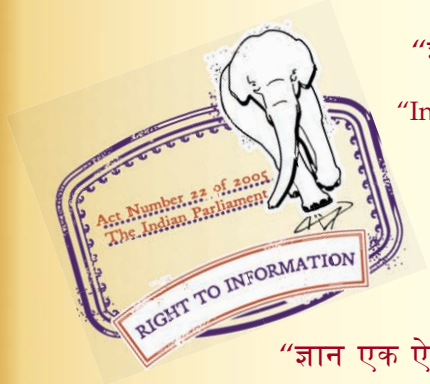

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IS : 8248 - 1976
(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR ANTIREFLECTION COATING ON GLASS OPTICAL COMPONENTS

UDC 681·7·064·454

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00

January 1977

Indian Standard

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SPECIFICATION FOR ANTIREFLECTION COATING ON GLASS OPTICAL COMPONENTS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 19 November 1976, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Antireflection coatings are used to reduce reflection losses at air-glass boundaries of optical components which results in increased transmission and improved contrast of the image.

0.3 This standard is intended to serve as a general guide to industry in respect of their requirements for production of single layer antireflection coating on glass surfaces which have a refractive index in the range from 1·5 to 1·7.

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1. SCOPE

1.1 This standard specifies the requirements and tests of single layer antireflection coating on optical components like prisms, lenses and plates using magnesium fluoride in the visible region from 400 to 700 nm.

2. GENERAL REQUIREMENTS

2.1 Material — The material used for film deposition shall be magnesium fluoride of refractive index 1·38 to 1·40 (a grade specially prepared for optical coatings) free from magnesium oxide and other impurities, particularly, chlorides.

2.2 Glass — The surface of the glass shall be reasonably free from defects, such as scratches, pits, watermarks, stains, oil or greasy film, etc.

2.3 Coated Area — The entire clear aperture of the optical component shall be coated leaving preferably, a peripheral zone of 1·0 mm (which is essentially required to hold it in jig in the coating plant).

2.4 Film Deposition Process — The process of film deposition shall be such as not to cause spatter marks in film and also impairment of the optical surfaces.

3. FUNCTIONAL REQUIREMENTS

3.1 Colour of the Film — When white light from a fluorescent tube (colour temperature 6 500 K) strikes the film coated surface at near normal incidence, the reflecting surface shall appear either purple or violet or of any intermediate shade in between these colours.

3.2 Colour Variations — Colour variations over a coated surface shall not be allowed. However, variation may be allowed between different surfaces within the accepted colour range (*see* **3.1**).

3.3 Percent Transmission — The maximum percent transmission of a single and both sides coated glass with refractive index between 1·5 and 1·7 shall not be less than the values given below and this value shall be in the wavelength range of 500 to 600 nm not taking into consideration the absorption losses due to thickness of material:

Refractive index	1·5	1·6	1·7
Single side coating	94·0	93·5	92·5
Double side coating	96·5	97·5	98·5

3.4 The coated surfaces shall be reasonably hard and durable and shall withstand normal process of cleaning with an optical linen wetted with alcohol. This shall be checked on a sample glass plate of thicknes 2 to 4 mm bloomed simultaneously with the components. The hardness of film may also be tested in accordance with the method described in Appendix A of IS : 988-1959*.

4. TESTS

4.1 A visual inspection shall be made at the completion of each deposition process. This inspection shall be aimed to observe any spatter marks, pin holes, etc, in the film only; any imperfections in the glass surface supporting the film shall not be considered by this inspection. The requirements specified in **2.3** and **2.4** shall also be checked during this inspection.

*General requirements for optical components.

4.2 The percentage transmission of the optical components shall be tested as under:

Both sides polished glass plate of thickness 2 to 4 mm and of the same refractive index and bloomed simultaneously with a batch of optical components, shall be tested in the apparatus given in IS : 2754-1964* or a similar apparatus for measuring the paraxial transmission. For this apparatus, a CIE standard light source 'c' and detector fitted with an eye response filter attached to the integrating sphere, shall be used.

4.3 There shall be no visible evidence of deterioration of blooming after being subjected to conditions as specified in **7.5** of IS : 988-1959†.

4.4 There shall be no visible evidence of corrosion after being subjected to the condition specified in **7.6** of IS : 988-1959†.

4.5 There shall be no deterioration of blooming after being subjected to the following test:

The bloomed elements shall be immersed for a period of 24 hours in a solution of water and common salt (sodium chloride). The mixture shall be 8 g of salt per litre of water at room temperature. After the required period of time, the samples shall be removed from solution and dried with tissue paper or laundered white muslin. A visual inspection shall then be made to detect any deterioration or removal of the film.

NOTE — The tests at **4.3** to **4.5** shall be carried out for the purpose of type approval and shall not be used as routine tests during batch production. These tests may, however, be used for control testing of batch samples subject to prior agreement between the manufacturer and the purchaser. A minimum of 3 percent of bloomed components produced in each batch shall be subjected to these tests.

5. PACKING AND PACKAGING

5.1 The method of packing and packaging of bloomed optical components shall be as specified in IS : 988-1959†.

*General requirements for optical instruments.
†General requirements for optical components.

INDIAN STANDARDS
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MATERIALS AND COMPONENTS FOR INSTRUMENTS

IS:

5415-1969 Code of practice for packing and packaging of optical and mathematical instruments and components

7010-1973 Pivots for magnetic compasses

7011-1973 Back-silvered mirrors used in instrument industry

7020-1973 Crystals and dielectric materials used in instrument industry

7047-1973 Timbers used in instrument industry

7078-1973 Plastics used in instrument industry

7265-1973 Coating materials (metals, alloys and dielectrics) used in optical instruments industry

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Printed at Printograph, New Delhi, India